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(54) Title: **SUSPENDING CLEAR CLEANSING FORMULATION**

(57) Abstract: A shower gel formulation having a clear appearance is described which suspends insoluble particles, water insoluble liquids or bubbles and contains an acrylate copolymer, an anionic surfactant, a cationic polymer and, optionally, an amphoteric surfactant. The method of use of the clear shower gel is also described.

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SUSPENDING CLEAR CLEANSING FORMULATION

This application claims the benefit of U.S. Provisional Application No. 60/153,355 filed September 10, 1999.

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The invention relates to a shower gel formulation.

Shower gel formulations which are mild to the skin are well known in the art. Such a formulation may optionally contain skin feel agents, such as cationic polymers. However, when one desires to suspend particulates and/or beads in the formulation, frequently substantial quantities of anionic surfactants have been incorporated, and provide clear solutions. Unfortunately, the addition of such anionic surfactants diminishes the mildness of the shower gel formulation.

U.S. Patent No. 5,656,257 (Fealy et al., issued on August 12, 1997), which is here incorporated by reference, discloses an anionic shampoo and conditioning composition comprising an oily conditioning agent, a shampooing agent, and an acrylate copolymer, a cationic conditioning agent and water. In this formulation, the acrylate copolymer is used to suspend the anionic shampooing and cationic conditioning agent and prevent it then from inactivating one another. U.S. Patent No. 5,656,257 does not, however, disclose a clear, mild cleansing composition containing a combination of surfactant types, which is capable of suspending beads or other insoluble particulates or gas bubbles.

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U.S. Patent No. 4,552,685 (Kernstock et al., issued November 12, 1985), which is here incorporated by reference, discloses examples of useful acrylate polymers and copolymers capable of thickening mild cleansing agents containing amphoteric surfactants and betaines. However, there is no teaching in that patent regarding the compatability of cationic polymer conditioning agents in the formulation, nor the suspending power of the solution for insoluble beads, particulates or gaseous bubbles.

U.S. Patent No. 3,759,861 (Shimokawa, issued September 18, 1973), which is here incorporated by reference, discloses a clear polymer adhesive complex of an acrylate containing polymer and surfactant used to produce a flocculant.

However, there is no disclosure of a shower gel or other cleansing composition containing a cationic conditioning agent or complex which can suspend particulates or gas bubbles.

The present invention comprises a shower gel formulation having a clear appearance and which suspends beads (e.g. agar/TiO₂/sunflower oil beads), insoluble particles and gas bubbles while having one or more acrylate copolymers, a betaine or other amphoteric surfactant and a cationic polymer (e.g. guar) present in the formulation.

It is known that anionic acrylates (i.e. Aculyn type acrylates (available from ISP)), being anionic polymers are generally considered to be incompatible with cationic charged ingredients. It is further known that polymeric cationics, as well as some large, bulky quaternary

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materials, can possibly be incorporated in formulations containing such acrylates. The optimum order of addition in these instances generally requires the acrylate to be neutralised with a base prior to the addition of any cationics.

The applicants have discovered that a clear or transparent product can be produced by either partially neutralising such acrylates prior to cationic addition or after cationic addition. Clarity or transparency is herein defined as having a turbidity less than or equal to 105 NTU (Nephelometric Turbidity Units).

The applicants have further discovered that amphoteric surfactants, such as betaine (which is also cationic in nature and not a true amphoteric), may be optionally added to the inventive formulation in the range of 0.01 - 15 weight percent, preferably 1-10 weight percent to increase mildness without creating noticeable haziness. Prior art shower gels that suspend beads or particulate matter are primarily composed of anionic surfactant and structurant which in most cases are harsher than the inventive formula.

In one embodiment, the present invention provides an aqueous, clear shower gel which is capable of suspension, comprising:

About 10-20 weight percent of at least one anionic surfactant;

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About 2-15 weight percent of at least one betaine or other amphoteric surfactant;

5 About 2-15 weight percent of at least one acrylate copolymer;

About 0.05 - 2 weight percent of at least one cationic polymer;

10 About 0.1 - 5 weight percent of beads or particulates;

About 0.1-5 weight percent of a benefit agent such as a water soluble or dispersible silicone polymer;

15 About 0.1-2 weight percent of a preservative such as a biocide;

In another embodiment, the present invention provides an aqueous, clear cleansing gel that is capable of suspending insoluble material or gas bubbles, comprising:

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- a. about 5 to 30, preferably 8 to 20 weight percent of at least one anionic surfactant;
 - b. about 2 to 15, preferably 2 to 10 weight percent of at least one amphoteric surfactant;
 - c. about 0.1 to 10, preferably 0.5 to 5 weight percent of at least one acrylate copolymer;
 - d. about 0.01 to 5, preferably 0.1 to 2 weight percent of at least one cationic polymer;
 - e. about 0.01 to 5, preferably 0.05 to 3 weight percent of at least one insoluble component
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selected from the group consisting of beads, particulates, water insoluble liquids and gas bubbles;

- f. about 50 to 85 weight percent of water
- 5 g. about 1.9:1 to 15:1, preferably 1.9:1 to 10:1 weight percent ratio range of anionic surfactant to amphoteric surfactant;
- h. about 0.1:1 to 15:1, preferably 0.3:1 to 10:1, weight percent ratio range of the sum of cationic polymer and amphoteric surfactant to acrylate
- 10 copolymer; and

wherein the concentration of acrylate copolymer is sufficient to suspend said at least one insoluble component, preferably wherein the viscosity range is between 6,000 and 20,000 cps, and the pH is in the range of 5.5 to 7.0.

In a further embodiment, the present invention provides an aqueous, clear cleansing gel which is capable of suspending insoluble material or gas bubbles, comprising:

- a. about 5 to 30, preferably 8 to 20 weight percent of at least one anionic surfactant;
- b. about 0.1 to 10, preferably 0.5 to 5 weight percent of at least one acrylate copolymer;
- 25 c. about 0.01 to 5, preferably 0.1 to 2 weight percent of at least one cationic polymer;
- d. about 0.01 to 5, preferably 0.05 to 3 weight percent of at least one insoluble component
- 30 selected from the group consisting of beads,

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particulates, water insoluble liquids and gas bubbles;

e. about 50 to 85 weight percent of water; and

5 wherein the concentration of acrylate copolymer is sufficient to suspend said at least one insoluble component, preferably wherein the viscosity range is between 6,000 and 20,000 cps, and the pH is in the range of 5.5 to 7.0.

10 Amonic surfactants, foam boosters, amphoteric and zwitterionic surfactants, which are useful in the present invention, are described in U.S. Patent No. 5,221,530, issued to Janchitraponvej et al. on June 22, 1993, which is herein incorporated by reference.

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Acrylate polymers and copolymers which are useful in the invention include one or more copolymers containing at least one monomer selected from the group consisting of

methacrylic acid, acrylic acid, amino acrylic acid, an
20 acrylic acid ester of a C8 -30 alkyl, alkylaryl, aryl, heterocyclic, alkoxyl, alkoxyl alkyl ester of a C8-30 alkyl or alkenyl; either substituted or unsubstituted; a methacrylic acid ester of a C8 -C30 alkyl, alkylaryl, aryl, heterocyclic, alkoxyl, alkoxyl alkyl ester of a C8-30 alkyl,
25 or alkenyl; either substituted or unsubstituted; a C1-4 alkyl acrylate, and a C1-4 methacrylate; either substituted or unsubstituted, and the like. Other useful acrylate polymers and copolymers are disclosed in U.S. Patent No. 5,656,257.

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Preferred acrylate polymers include the following INCI named materials: acrylates/c12-24 pareth-25 acrylate copolymer, obtainable as Synthalen® W2000 from 3V Inc. (Wehawken, NJ); acrylates/steareth-20 methacrylate copolymer obtainable as Aculyn® 22 from International Specialty Products Corp. (Lombard, IL); and acrylates copolymer obtainable as either Aculyn® 33 from International Specialty Products Corp. or as Polymer EX-518® from BF Goodrich Corp. (Brecksville, OH); acrylates/steareth-20 itaconate copolymer, obtainable as Structure 2001®; acrylates/ceteth-20 itaconate copolymer, obtainable as Structure 3001®; and acrylates/aminoacrylates/C10-30 alkyl PEG-20 itaconate copolymer, obtainable as Structure Plus® all from National Starch & Chemical, Inc. (Bridgewater, NJ), and the like.

The inventive compositions may be used for the cleansing of the user's skin and hair and is applied to a surface (e.g. a skin surface) via topical applications to release or deposit an effective amount of the transparent composition to perform the desired cleansing function. The frequency of topical application can vary widely, depending on the user's need. With respect to personal application to the skin, such application can range from about once per day to about four times per day, preferably from about twice a day to about three times a day.

The following examples are intended to illustrate the invention and not limit the invention in any way.

Several inventive transparent shower gels with suspended insoluble particles were prepared and compared to

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comparative shower gels that did not display clarity. The compositions of these shower gels are summarised in Tables 1 and 2. The processing methods used to prepare these compositions listed in Table 1 are provided below:

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Ingredients	Ex. 1 %wt/ wt	Ex. 2 %wt/ wt	Ex. 3 %wt/ wt	Ex. 4 %wt/ wt	Ex. 5 %wt/ wt	Ex. 6 %wt/ wt	Ex. 7 %wt/ wt	Ex. 8 %wt/ wt	Ex. 9 %wt/ wt	Ex. 10 %wt/ wt	Ex. 11 %wt/ wt	Ex. 12 %wt/ wt	Ex. 13 %wt/ wt	Ex. 14 %wt/ wt
Sodium Laureth Sulfate	11.0	13.0	11.0	10.0	11.0	11.0	7.0	11.0	11.0	20.0	11.0	11.0	11.0	11.0
Cocamidopropyl betaine	6.0		3.0	2.1	3.0	3.0	6.0	3.0	3.0	6.0	3.0	3.0	3.0	6.0
Acrylates Copolymer	1.8	2.0	1.5		3.0		1.8		2.0	4.0			2.0	1.8
Acrylates/C12-24 Pareth-25 Acrylate Copolymer				3.0				1.75						
Acrylates/Steareth-20 Methacrylate copolymer	1.25	0.5			0.5		1.0		0.5	1.0			0.5	1.0
Acrylates/Steareth-20 Itaconate Copolymer											5.0			
Acrylates/Ceteth-20 Itaconate Copolymer												5.0		
Acrylates/Amino-acrylates Copolymer						2.18								

Disodium Dimethicone Copolyol Sulfosuccinate	0.15	0.25	0.15		0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Fragrance		0.86	0.86																	
Polyquaternium -22																				0.2
Polyquaternium -10																				0.2
Hydroxypropyl Guar Hydroxypropyl Trimonium Chloride	0.1	0.2	0.2		0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Ammonium Sulfate			0.6				1.5	0.25												
Propylene Glycol	2.0	0.5	0.5		1.0	0.5	1.0	0.5	1.5	5.0	1	2.7	1.0							
DMDM Hydantoin + IPBC	0.22			0.22		0.22	0.22		0.22	0.22	0.22		0.22							0.22
Methylchlorois othiazolinone (and) Methylisothiaz olinone		0.000 3	0.00 03		0.000 4		0.00 03	0.00 03										0.000 3		
Sodium Hydroxide	0.5	0.5	0.25	0.75	1.0		0.5	1.0	1.0	0.5	0.5	0.4	0.5							0.5
Citric Acid						0.5														
Insoluble components	0.5	0.05	0.05	0.5	0.05	0.5	0.5	0.05	0.5	0.5	0.5	0.05	0.5	0.5	0.5	0.5	0.05	0.05	0.05	0.05

Note: I is inventive and C is comparative

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METHOD 1:

The initial distilled water charge was added to a center turbine tank with wall scrape agitation and heated to 73.8°C (165°F). The temperature was maintained at 73.8°C (165°F). Agitation of the center turbine was increased as was the wall sweep so that there was a slight vortex. Acrylate copolymer was added to the tank and mixed. The anionic surfactants were then added to the tank and mixed, and then the amphoteric surfactant was added and mixed. The cationic polymer was premixed with propylene glycol if the cationic polymer was a solid, and was mixed well with no lumps. If the cationic polymer was a liquid, it was added straight to the tank. Then the glycerin was added. Agitation was decreased, and mixing was continued for 30 minutes at 73.8°C (165°F) and then cooled to 35°C (95 °F). During the cooling process, the pH was measured and adjusted with an alkaline pH adjuster to clarity within a target pH range of 5.5 to 7.0.

At 46.1°C (115 °F), the preservative was added and at 40.6°C (105 °F) the fragrance was added and mixed well. The mixture was then cooled to 35°C (95 °F). At 35°C (95 °F), the viscosity was measured and adjusted with ammonium sulfate to the desired viscosity. The insoluble components were added and mixed gently. The mixture was then cooled to room temperature.

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METHOD 2:

The initial distilled water charge was added to a center turbine tank with wall scrape agitation and heated to and maintained at 73.3°C (165°F). The agitation of the center turbine and the wall sweep was increased so that there was a slight vortex. Tetrasodium EDTA was added to the tank and mixed. The cationic polymer was premixed with propylene glycol if the cationic polymer was a solid, and mixed well with no lumps. If the cationic polymer was a liquid, it was added straight to the tank. The anionic surfactants were added and mixed. Next the amphoteric surfactants were added and mixed, and then the acrylate copolymer was added and mixed. The composition was then mixed for 30 minutes at 73.8°C (165°F), and was then cooled to 35°C (95 °F). At 46.1°C (115 °F), the preservative was added and mixed well. At 35°C (95 °F), the pH was measured and adjusted with citric acid to clarity within a target pH range of 5.5 to 7.0. At 35°C (95 °F), the viscosity was measured and adjusted if necessary to the desired viscosity. The insoluble components were then added and mixed, and the composition cooled to room temperature.

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METHOD 3:

The initial distilled water charge was added to a center turbine tank with wall scrape agitation and heated to and maintained at 73.8°C (165°F). Agitation of the center turbine and the wall sweep was increased so that there was a slight vortex. The acrylate copolymer was added to the tank and mixed. The anionic surfactant was added and mixed. Agitation was decreased and the amphoteric surfactant added and mixed. The cationic polymer was premixed with propylene glycol if the cationic polymer was a solid, and mixed well with no lumps. If the cationic polymer was a liquid, it was added straight to the tank. The remaining acrylate copolymer was premixed with water to a dilution of 4.5 to 1 and added to the tank and mixed with gentle agitation. The batch was mixed for 30 minutes at 73.8°C (165°F) and was started to be cooled to 35°C (95 °F). At 48.9°C (120 °F), the glycerin was added, at 46.1°C (115 °F), the preservative and then the UV inhibitor were added. At 43.3°C (110 °F), the EDTA and the EHDP were added and at 40.6°C (105 °F), the fragrance was added and mixed. At 35°C (95 °F), the pH was measured and adjusted with an alkaline pH adjuster to clarity within a target pH range of 5.9 to 7.0. At 35°C (95 °F), the viscosity was measured and adjusted with propylene glycol to the desired viscosity. The insoluble components were then added and mixed gently, and the composition cooled to room temperature.

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METHOD 4:

The initial distilled water charge was added to a center turbine tank with wall scrape agitation and heated to and maintained at 46.1°C (115°F). Agitation of the center turbine and the wall sweep was increased so that there was a slight vortex. Preservative was added to the tank and mixed. The acrylate copolymer was added to the tank slowly and mixed for 5 minutes. The anionic surfactants were added, then the amphoteric surfactants and mixed. The batch was cooled to 35°C (95 °F). At 35°C (95 °F), the pH was measured and adjusted with an alkaline pH adjuster to a target pH range of 5.5 to 7.0. At 35°C (95 °F), the viscosity was measured and adjusted with propylene glycol to the desired viscosity. The insoluble components were added and mixed, and the composition cooled to room temperature.

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METHOD 5:

The initial distilled water charge was added to a center turbine tank with wall scrape agitation and heated to and maintained at 73.8°C (165°F). Agitation of the center turbine and the wall sweep was increased so that there was a slight vortex. The acrylate copolymer was added to the tank and mixed. The anionic surfactant was then added and mixed. Agitation was decreased, and the amphoteric surfactant added and mixed. The cationic polymer was premixed with propylene glycol if the cationic polymer was a solid, and mixed well with no lumps. If the cationic polymer was a liquid, it was added straight to the tank. The remaining acrylate copolymer was premixed with water to a dilution of 4.5 to 1, added to the tank and mixed with gentle agitation. The batch was mixed for 30 minutes at 73.8°C (165°F), and then started to cool to 35°C (95 °F). At 48.9°C (120 °F), the glycerin was added, at 46.1°C (115 °F) the preservative and then the UV inhibitor were added. At 43.3°C (110 °F), the EDTA and the EHDP were added and mixed. At 35°C (95 °F), the pH was measured and adjusted with an alkaline pH adjuster to clarity within a target pH range of 5.9 to 7.0. At 35°C (95 °F), the viscosity was measured and adjusted with propylene glycol to the desired viscosity. The insoluble components were then added and mixed gently, and the composition cooled to room temperature.

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METHOD 6:

The initial distilled water charge was added to a center turbine tank with wall scrape agitation and heated to and maintained at 73.8°C (165°F). Agitation of the center turbine and the wall sweep was increased so that there was a slight vortex. Tetrasodium EDTA was added to the tank. The cationic polymer was premixed with propylene glycol if the cationic polymer was a solid, and mixed well with no lumps. If the cationic polymer was a liquid, it was added straight to the tank. Agitation was decreased, and the acrylate copolymer(s) added and mixed. The anionic surfactants were added to the tank and mixed. The amphoteric surfactant was added next and mixed. This was mixed for 30 minutes at 73.8°C (165°F) and then cooled to 35°C (95 °F). At 46.1°C (115 °F), the preservative was added and mixed well. At 35°C (95 °F), the pH was measured and adjusted with an alkaline pH adjuster to clarity within a target pH range of 5.5 to 7.0. At 35°C (95 °F), the viscosity was measured and adjusted with propylene glycol to the desired viscosity. The insoluble components were added and mixed, and the composition cooled to room temperature.

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METHOD 7:

The initial distilled water charge was added to a center turbine tank with wall scrape agitation and heated to and maintained at 73.8°C (165°F). Agitation of the center turbine and the wall sweep was increased so that there was a slight vortex. Tetrasodium EDTA was added to the tank and then subsequently the acrylate copolymer(s). The anionic surfactants were then added to the tank and mixed. The amphoteric surfactant was added next and mixed. The cationic polymer was premixed with propylene glycol if the cationic polymer was a solid, and mixed well with no lumps. If the cationic polymer was a liquid, it was added straight to the tank. Agitation was decreased and the composition was mixed for 30 minutes at 73.8°C (165°F) and then was cooled to 35°C (95 °F). At 46.1°C (115 °F), the preservative were added and mixed well. At 35°C (95 °F), the pH was measured and adjusted with an alkaline pH adjuster to clarity within a target pH range of 5.5 to 7.0. At 35°C (95 °F), the viscosity was measured and adjusted with propylene glycol to the desired viscosity. The insoluble components were added and mixed, and the composition cooled to room temperature.

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METHOD 8:

The initial distilled water charge was added to a center turbine tank with wall scrape agitation and heated to and maintained at 73.8°C (165°F). Agitation of the center turbine and the wall sweep was increased so that there was a slight vortex. The acrylate copolymer was added to the tank and mixed. The anionic surfactant was added and mixed. Agitation was decreased and the amphoteric surfactant added and mixed. The cationic polymer was premixed with propylene glycol if the cationic polymer was a solid, and mixed well with no lumps. If the cationic polymer was a liquid, it was added straight to the tank. The remaining acrylate copolymer was premixed with water to a dilution of 4.5 to 1 and added to the tank and mixed with gentle agitation. The batch was mixed for 30 minutes at 73.8°C (165°F) and cooled to 35°C (95 °F). At 48.9°C (120 °F) the glycerin was added, and at 46.1°C (115 °F) the preservative and then the UV inhibitor were added. At 43.3°C (110 °F), the EDTA and the EHDP were added and mix. At 40.5°C (105 °F) the fragrance was added and mixed well. At 35°C (95 °F), the pH was measured and adjusted with an alkaline pH adjuster to clarity within a target pH range of 5.9 to 7.0. At 35°C (95 °F), the viscosity was measured and adjusted with propylene glycol to the desired viscosity. The insoluble components were added and mix, and the composition cooled to room temperature.

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METHOD 9:

The initial distilled water charge was added to a center turbine tank with wall scrape agitation and heated to and maintained at 73.8°C (165°F). Agitation of the center turbine and the wall sweep was increased so that there is a slight vortex. The acrylate copolymer was added to the tank and mixed. The anionic surfactant was added and mixed. Agitation was decreased, and the amphoteric surfactant added and mix. The cationic polymer was premixed with propylene glycol if the cationic polymer was a solid, and mixed well with no lumps. If the cationic polymer was a liquid, it was added straight to the tank. The remaining acrylate copolymer was premixed with water to a dilution of 4.5 to 1 and added to the tank and mixed with gentle agitation. The batch was mixed for 30 minutes at 73.8°C (165°F) and was then cooled to 35°C (95 °F). At 46.1°C (115 °F) the preservative was added, and at 40.6°C (105 °F) the fragrance was added and mixed. At 35°C (95 °F), the pH was measured and adjusted with an alkaline pH adjuster to clarity within a target pH range of 5.9 to 7.0. At 35°C (95 °F), the viscosity was measured and adjusted with propylene glycol to the desired viscosity. The insoluble components were added and mixed gently, and the composition cooled to room temperature.

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METHOD 10:

The initial distilled water charge was added to a center turbine tank with wall scrape agitation and heated to and maintained at 73.8°C (165°F). Agitation of the center turbine and the wall sweep was increased so that there was a slight vortex. EDTA was added to the tank and mixed. The cationic polymer was premixed with propylene glycol if the cationic polymer was a solid, and mixed well with no lumps. If the cationic polymer was a liquid, it was added straight to the tank. The anionic surfactant was added and mixed. The amphoteric surfactant was added and mixed. The acrylate copolymer was added to the tank and mixed. The agitation was decreased and the batch mixed for 30 minutes at 73.8°C (165°F) and then cooled to 35°C (95 °F). At 46.1°C (115 °F), the preservative was added and mixed. At 35°C (95 °F), the pH was measured and adjusted with an alkaline pH adjuster to clarity within a target pH range of 5.9 to 7.0. At 35°C (95 °F), the viscosity was measured and adjusted with propylene glycol to the desired viscosity. The insoluble components were added and mixed, and the composition cooled to room temperature.

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METHOD 11:

The initial distilled water charge was added to a center turbine tank with wall scrape agitation and heated to and maintained at 73.8°C (165°F). Agitation of the center turbine and the wall sweep was increased so that there was a slight vortex. EDTA and then the acrylate copolymers were added to the tank and mixed. The anionic surfactant was added and mixed. The amphoteric surfactant was added and mixed. The cationic polymer was premixed with propylene glycol if the cationic polymer was a solid, and mixed well with no lumps. If the cationic polymer was a liquid, it was added straight to the tank. The agitation was decreased and the batch mixed for 30 minutes at 73.8°C (165°F), and then cooled to 35°C (95 °F). At 46.1°C (115 °F), the preservative was added and mixed. At 35°C (95 °F), the pH was measured and adjusted with an alkaline pH adjuster to clarity within a target pH range of 5.9 to 7.0. At 35°C (95 °F), the viscosity was measured and adjusted with propylene glycol to the desired viscosity. The insoluble components were added and mixed, and the composition cooled to room temperature.

Example 15

The following is another example of the invention.

Ingredient	% by weight
Anionic surfactant (e.g. Sodium Laureth Sulfate (3EO))	About 10-20
Betaine (e.g. Cocoamidopropyl betaine)	About 2-15
Acrylate Copolymer (e.g. Aculyn 33 and 22)	About 2 - 15
Silicone (e.g. Dimethicone Copolyol Sulfosuccinate)	About 0.1 - 5
Fragrance	About 0 - 1.0
Cationic surfactant (e.g. Hydroxypropyl Guar Hydroxypropyl Trimonium Chloride)	About .05 - 5
Propylene Glycol	About 0.1 - 2.0
Preservative	About 0.1 - 2.0
Sodium Hydroxide	to adjust pH to 6.0 to 7.0
Beads (e.g. Agar/ Titanium Dioxide/Sunflower Oil Beads)	About 0.1 - 2.0
Water	q.s. to 100

METHODS

Viscosity

- 5 For the purposes of this invention, viscosity is measured using conventional techniques with a Brookfield viscometer, Model HBDVII+ CP, spindle No. 41 at 0.5 rpm at 25°C.

Turbidity

- 10 For the purposes of this invention, the acceptability of formulation clarity was measured qualitatively and quantitatively using a visual method of turbidity determination and a turbidimeter respectively. Briefly, the
- 15 visual method involves looking through a determined path length of the formulation to a visual target and determining if the visual target is legible or recognizable. This target may be a straight line, a set of parallel lines, or a number or letter printed on white paper. To assess
- 20 turbidity, the test formulation was placed in a glass beaker such that the height from the bottom of the beaker to the top surface of the formulation was 10.16 cm (four inches). The formulation is made free of air bubbles. A piece of paper with the visual target is placed under the beaker.
- 25 The assessor then looked through the top surface of the formulation to the visual target. If the visual target appeared similar to the original, the formulation is of acceptable clarity and receives a 'pass' rating. If the visual target appeared significantly hazy, or is out of
- 30 focus compared to the original target, the formulation is of unacceptable clarity and receives a 'fail' rating.

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Turbidity was quantitatively determined by a Turbidimeter, Model DRT-100D, manufactured by Shaban Manufacturing Inc, H. F. Instruments Division using a sample cuvette of 28 mm diameter by 91 mm in length with a flat bottom. Samples that
5 had received a 'pass' rating from the visual method were found to have a turbidity measurement of less than or equal to 105 NTU's (Nephelometric Turbidity Units). Samples that had received a 'fail' rating from the visual method were
10 found to have a turbidity measurement of greater than 105 NTU's.

The foregoing description and examples illustrate selected embodiments of the present invention. In light thereof, variations and modifications will be suggested to one
15 skilled in the art, all of which are written the scope and spirit of this invention.

Claims

1. A transparent cleansing composition, comprising:

- 5 a. 5 to 30 weight percent of at least one anionic
 surfactant;
- b. 2 to 15 weight percent of at least one amphoteric
 surfactant;
- c. 0.1 to 10 weight percent of at least one acrylate
10 copolymer;
- d. 0.01 to 5 weight percent of at least one cationic
 polymer;
- e. 0.01 to 5 weight percent of at least one insoluble
15 component selected from beads, particulates, water
 insoluble liquids and gas bubbles, and mixtures
 thereof;
- f. 50 to 85 weight percent of water;
- g. wherein there is a weight percentage ratio range
 of anionic surfactant to amphoteric surfactant of
20 1.9:1 to 15:1;
- h. wherein there is a weight percent ratio range of
 the sum of cationic polymer and amphoteric
 surfactant to acrylate copolymer of 0.1:1 to 15:1;
 and
25 wherein the concentration of acrylate copolymer is
 sufficient to suspend said at least one insoluble
 component.

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2. The cleansing composition of claim 1, comprising:

- 5 a. 8 to 20 weight percent of at least one anionic surfactant;
- b. 2 to 10 weight percent of at least one amphoteric surfactant;
- c. 0.5 to 5 weight percent of at least one acrylate copolymer;
- 10 d. 0.1 to 2 weight percent of at least one cationic polymer;
- e. 0.05 to 3 weight percent of at least one insoluble component selected from the group consisting of beads, particulates, water insoluble liquids and
- 15 gas bubbles;
- f. 50 to 85 weight percent of water;
- g. wherein there is a weight percent ratio range of anionic surfactant to amphoteric surfactant of 1.9:1 to 10:1;
- 20 h. wherein there is a weight percent ratio range of the sum of cationic polymer and amphoteric surfactant to acrylate copolymer of 0.3:1 to 10:1; and
- 25 wherein the viscosity range is between 6000 and 20000 cps, and the pH is in the range of 5.5 to 7.0.

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3. The cleansing composition of claim 1 or claim 2 wherein the anionic surfactant is selected from alkyl sulfates, alkyl ether sulfates, alkyl sulfonates, alkylbenzene sulfonates, alkyl succinates, alkyl sulfosuccinates, alkyl olefin sulfonates, alkyl sarcosinates, octoxynol phosphates nonoxynol phosphates, alkyl taurates, polyoxyethylene sulfates, polyoxyethylene isethionates, alkyl carboxylates and alkyl ether carboxylates, and mixtures thereof.
4. The cleansing composition of any of the preceding claims wherein the amphoteric surfactant is selected from alkyl betaines, alkyl amino betaines, hydroxysultaines, alkyl amphotacetates and alkylampho carboxyglycinates, and mixtures thereof.
5. The cleansing composition of any of the preceding claims wherein the at least one acrylate copolymer includes one or more copolymers containing at least one monomer selected from methacrylic acid, acrylic acid, amino acrylic acid, an acrylic acid ester of a C8 -30 alkyl, alkylaryl, aryl, heterocyclic, alkoxy, alkoxy alkyl ester of a C8-30 alkyl or alkenyl; either substituted or unsubstituted; a methacrylic acid ester of a C8 -C30 alkyl, alkylaryl, aryl, heterocyclic, alkoxy, alkoxy alkyl ester of a C8-30 alkyl, or alkenyl; either substituted or unsubstituted; a C1-4 alkyl acrylate, and a C1-4 methacrylate; either substituted or unsubstituted.

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6. The cleansing composition of any of the preceding claims wherein the cationic polymer is selected from quaternized guar gums, quaternized phosphate esters, quaternized polysaccharides or their derivatives, quaternized polyamides, quaternized polymeric derivatives of acrylates, methacrylates, acrylamides, methacrylamides or copolymers thereof, and quaternized polymeric derivatives of substituted allyl or vinyl compounds.
7. The cleansing composition of any of the preceding claims wherein the at least one insoluble component is selected from glass beads, plastic beads, macaroni food products, organic materials, inorganic materials, crystalline solids, oil droplets, vegetable and fruit purees, water insoluble dimethicones, air and gas bubbles, and mixtures thereof.
8. A transparent cleansing composition, comprising:
- a. 5 to 30 weight percent of at least one anionic surfactant;
 - b. 0.1 to 10 weight percent of at least one acrylate copolymer;
 - c. 0.01 to 5 weight percent of at least one cationic polymer;
 - d. 0.01 to 5 weight percent of at least one insoluble component selected from the group consisting of beads, particulates, water insoluble liquids and gas bubbles;

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e. 50 to 85 weight percent of water; and

wherein the concentration of acrylate copolymer is
sufficient to suspend said at least one insoluble
component.

9. The cleansing composition of claim 8, comprising:

- a. 8 to 20 weight percent of at least one anionic surfactant;
- b. 0.5 to 5 weight percent of at least one acrylate copolymer;
- c. 0.1 to 2 weight percent of at least one cationic polymer;
- d. 0.05 to 3 weight percent of at least one insoluble component selected from the group consisting of beads, particulates, water insoluble liquids and gas bubbles;
- e. 50 to 85 weight percent of water; and

wherein the viscosity range is between 6000 and 20,000 cps, and the pH is in the range of 5.5 to 7.0.

10. The cleansing composition of claim 8 or claim 9 wherein the anionic surfactant is selected from alkyl sulfates, alkyl ether sulfates, alkyl sulfonates alkylbenzene sulfonates, alkyl succinates, alkybenzene succinates, alkylbenzene sulfosuccinates, alkyl olefin sulfonates, alkyl sarcosinates, alkyl sulfosuccinates, octoxynol phosphates, nonoxynol phosphates, alkyl taurates,

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polyoxyethylene sulfates, polyoxyethylene, isethionates, alkyl carboxylates and alkyl ether carboxylates, and mixtures thereof.

- 5 11. The cleansing composition of any of claims 8-10 wherein
the at least one acrylate copolymer includes one or
more copolymers containing at least one monomer
selected from methacrylic acid, acrylic acid, amino
acrylic acid, an acrylic acid ester of a C8 -30 alkyl,
10 alkylaryl, aryl, heterocyclic, alkoxy, alkoxy alkyl
ester of a C8-30 alkyl or alkenyl; either substituted
or unsubstituted; a methacrylic acid ester of a C8 -C30
alkyl, alkylaryl, aryl, heterocyclic, alkoxy, alkoxy
alkyl ester of a C8-30 alkyl, or alkenyl; either
15 substituted or unsubstituted; a C1-4 alkyl acrylate,
and a C1-4 methacrylate; either substituted or
unsubstituted.
12. The cleansing composition of any of claims 8-11 wherein
20 the cationic polymer is selected from quaternized guar
gums, quaternized phosphate esters, quaternized
polysaccharides or polysaccharide derivatives,
quaternized polyamides, quaternized polymeric
derivatives of acrylates, methacrylates, acrylamides,
25 methacrylamides or copolymers, quaternized polymeric
derivatives of substituted allyl or vinyl compounds.

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13. The cleansing composition of any of claims 8-12 wherein the at least one insoluble component is selected from glass beads, plastic beads, macaroni food products, organic materials, inorganic materials, crystalline solids, oil droplets, vegetable and fruit purees, water insoluble dimethicones, air and gas bubbles and mixtures thereof.
14. A method of cleaning the skin or hair with a transparent cleansing product comprising:
- a. 5 to 30 weight percent of at least one anionic surfactant;
 - b. 2 to 15 weight percent of at least one amphoteric surfactant;
 - c. 0.1 to 10 weight percent of at least one acrylate copolymer;
 - d. 0.01 to 5 weight percent of at least one cationic polymer;
 - e. 0.01 to 5 weight percent of at least one insoluble component selected from beads, particulates, water insoluble liquids and gas bubbles;
 - f. 50 to 85 weight percent of water;
 - g. wherein the weight percent ratio range of anionic surfactant to amphoteric surfactant is 1.9:1 to 15:1;

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- h. wherein the weight percent ratio range of the sum of cationic polymer and amphoteric surfactant to acrylate copolymer is 0.1:1 to 15:1; and

5

wherein the concentration of acrylate copolymer is sufficient to suspend said at least one insoluble component.

10

15. A method of cleansing the skin or hair with a transparent cleansing product comprising:

15

- a. 5 to 30 weight percent of at least one anionic surfactant;
- b. 0.1 to 10 weight percent of at least one acrylate copolymer;
- c. 0.01 to 5 weight percent of at least one cationic polymer;
- d. 0.01 to 5 weight percent of at least one insoluble component selected from the group consisting of beads, particulates, water insoluble liquids and gas bubbles;
- e. 50 to 85 weight percent of water; and

20

wherein the concentration of acrylate copolymer is sufficient to suspend said at least one insoluble component.

25

INTERNATIONAL SEARCH REPORT

International Application No:
PCT/EP 00/08265

A. CLASSIFICATION OF SUBJECT MATTER

C11D1/86, C11D1/90, C11D3/37, C11D3/22, A61K7/50

According to International Patent Classification (IPC) or to both national classification and IPC⁷

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

C11D, A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99/36054 A1 (RHODIA CHIMIE) 22 July 1999, abstract, page 9, lines 11-17, claims. --	1-15
"A"	GB 2283754 A (THE PROCTER & GAMBLE COMPANY) 17 May 1995, claims 1, 5, 6, 7, 9. --	1, 2, 5, 6, 8, 9, 11-15
A	US 5656257 A (FEALY et al.) 12 August 1997, the whole document. (cited in the application) --	1-3, 6-9, 11-15
A	WO 98/13022 A1	1, 2, 8,

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

04 December 2000

Date of mailing of the international search report

01.02.2001

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INTERNATIONAL SEARCH REPORT

International Application No.

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PCT/EP 00/08265

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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ANHANG

Zum internationalen Recherchenbericht über die internationale Patentanmeldung Nr.

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten internationalen Recherchenbericht angeführten Patentdokumente angegeben. Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

ANNEX

To the International Search Report to the international Patent Application No.

PCT/EP 00/08265 SAE 301789

This annex lists the patent family members relating to the patent documents cited in the above-mentioned search report. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

ANNEXE

Au rapport de recherche international relatif à la demande de brevet international n°

La présente annexe indique les membres de la famille de brevets relatifs aux documents de brevets cités dans le rapport de recherche international visée ci-dessus. Les renseignements fournis sont donnés à titre indicatif et n'engagent pas la responsabilité de l'Office.

Im Recherchenbericht angeführte Patentdokumente Patent document cited in search report Document de brevet cité dans le rapport de recherche	Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
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